

REGISTRATION AND SEARCH SYSTEM FOR OBTAINING INFORMATION  
ON FACILITIES

CROSS-REFERENCE TO RELATED APPLICATION

5           The present invention is related to Japanese  
patent application No. Hei. 2000-113553, filed April 14,  
2000; the contents of which are incorporated herein by  
reference.

10           FIELD OF THE INVENTION

The present invention relates to registration  
and search of facility information, and more  
particularly, to registration and search of facility  
information in a more efficient and effective manner.

15           BACKGROUND OF THE INVENTION

In recent years, search of facility  
information on a network by organizing information on  
various facilities into a database has become possible.  
20 Such facilities include gas stations and other items  
located along a vehicle route that a vehicle driver  
requires to determine whether to stop at a respective  
facility. Such systems must enable information  
providers to readily register facility information and  
25 enable users to search for information meeting their  
respective needs.

In connection with this, various proposals

have been made for ways to register and/or search facility information. For instance, Japanese Patent No. 2956587 discloses a method by which advertised information (facility information) is registered by  
5 relevance to map data by displaying a map and designating its location on that map. JP-A No. H10-89976, for example, discloses an apparatus for searching facility information, where it is assumed that the facility information relates to a map, by designating  
10 the type of facility and the range of maps to be searched. All embodiments of the prior art, typified by these examples, are intended to display facility information in a two-dimensional span by linking locational facility information with maps, and simplify  
15 both levels of registration by information providers and search by users in the position of a pertinent facility.

However, there are situations in which no prior art technique allows retrieval of information meeting the need of the searching user. This is mainly  
20 because the key category of facility information is map location. According to the Japanese Patent No. 2956587, for instance, as a user selects an icon on a map, i.e. designates locational information, the remaining items of information are provided. The JP-A No. H10-89976, as  
25 described above, enables facility information to be searched based on the type of facility and the geographical distance involved.

Thus, none of prior art techniques permits search by a minor category of information, which could be regarded as incidental. More specifically, it is impossible to search restaurants according to the availability of parking space or supermarkets according to what the loss leader is. By any conventional technique, such items of information are made available only after a facility is specified. Therefore, if a user searches for restaurants within a 1 km radius of a given point and finds 10 restaurants in the area, the search may end up with a finding that none of the 10 restaurants has a parking lot.

The present invention enables facility information to be registered or searched according to miscellaneous items of information (incidental information).

#### SUMMARY OF THE INVENTION

In a first aspect, a registrable information input unit of a registration terminal accepts facility information input from an information provider according to a registration template. The registration template provides predetermined registration headings, and items of information under these registration headings constitute facility information. This facility information is transmitted by a registrable facility information transmitter to a management center, and

stored into a facility information storage unit of the management center.

At a search terminal, a sought information input unit allows user to enter search conditions according to a search template. The search template provides predetermined search headings matching the registration headings, and items of information under these search headings constitute sought information. This arrangement allows facility information searching according to registration headings. This sought information is transmitted by a sought information transmitter to the management center.

At the management center, a search unit, using the transmitted sought information, searches facility information stored in the facility information storage unit. Then, a sought facility information transmitter transmits facility information search results to the search terminal, and a notifying unit of the search terminal notifies the facility information that the search result is transmitted from the management center.

The present invention uses a registration template to limit differences in entered categories of facility information from one registering information provider to another, and to have sufficient but not excessive facility information, including incidental information, entered to facilitate subsequent search. Since information providers have only to fill blanks

under registration headings, registration of facility information is much simpler. On the other hand, a search template is used to enable information matching the registration headings to be entered as sought information. Users have only to enter sought information by filling blanks under search headings and, as facility information is searched according to the sought information entered in this way, search facility information is also facilitated. Since search headings matching the registration headings are stated in the search template, search according to a category of incidental information is also made possible.

If the type of searched facility changes, the search conditions also change. According to another aspect, the registration headings and the search headings are set according to the facility type, allowing search of information according to more finely classified incidental information. Registration and search templates may be stored at the registration terminal and the search terminal in advance. It is best, however, to transmit them from the management center. Thus, if the variety of facility types increases, the increase can be addressed by having a registration or search template matching the increased variety transmitted by the management center.

There may also be items of information the pertinent facility wishes to emphasize. Therefore,

search headings matching registration headings mean  
search headings those registration headings that can be  
search keys. Preferably, not all items must be entered.  
For instance, where the locations, open hours and prices  
5 of facilities are stated as search headings, searching  
can be performed according to only the location, open  
hours, price or a combination of any two of these items.  
facilities can also be searched according to only one  
item of information or narrowed to a plurality of items.  
10 The effectiveness of the search can be enhanced by  
utilizing incidental information as well.

Preferably, information providers who supply  
facility information can determine whether information  
provided meets user's search conditions. Accordingly,  
15 the number of successful search attempts (number of  
hits) is stored into a search frequency storage unit of  
the management center for each unit of facility  
information. Therefore, if this number is made known to  
information providers, it provides a measure of need for  
20 updating facility information. Specifically, if the  
number of hits is too small, the information provider  
concerned can update the information contents to more  
effective ones. If useful information increases as a  
result, users will more frequently access this system.

25 In another aspect, the number of times  
facility information is utilized (frequency of  
utilization) is stored in a utilization frequency

storage unit at the management center for each unit of facility information. This information is provided to information providers as the number of hits. Accordingly, when a unit of facility information is  
5 utilized, the search terminal notifies the utilized unit of facility information to the management center. Conceivably, determination as to whether a given unit of facility information has been utilized is made, where for instance the configuration is such that only the  
10 name of a facility is first displayed on a display unit or the like as facility information retrieved by search, according to whether that facility name has been selected by an operation by an user and any other unit of facility information has been referenced.

15 To allow information providers to use the system to promote the use of particular facilities, i.e. for advertising or promotions, in storing a particular unit of facility information from the registration terminal, the management center calculates the  
20 registration fee for that unit of information. By using the revenue of such registration fees to pay the operating system maintenance costs or the cost to users for communicating with the management center, it will provide added revenue or user advantage.

25 In another aspect, the registration fee is discounted based on the number of hits or frequency of utilization or both. This provides incentive to

information providers to provide more of useful facility information and enhance the number of hits and/or the frequency of utilization, and eventually contribute to expanding the utilization of the system.

5           In another aspect, while the search terminal can be a desktop unit, it can have a mobile configuration embodied in a laptop or handheld unit. Accordingly, locational information can be displayed as an item of facility information such as an icon or the  
10 like on a map shown on the display unit of the search terminal.

          In another aspect, the registration procedure for locational information is simplified and, moreover, at least locational information as an item of facility  
15 information is associated with map data. This locational information can be readily displayed on a map at the search terminal as well. It is also conceivable to transmit the map data from the management center to be displayed at the time registration because, unlike at  
20 the search terminal, it is sufficient at the registration terminal to display on a map covering the vicinity of the pertinent registered facility. When updating facility information, too, the information to be updated can be readily selected if map data  
25 associated with the location of the facility are transmitted from the management center.

          The search terminal can be a mobile unit in a



car navigation system having a route guidance function. In this case, the search terminal functioning as a car navigation system may have a configuration in which the current location, destination, points en route and  
5 guided route among other items are transmitted to the management center as sought information or as part of sought information. Then, the management center search unit searches its store of facility information with the current location, destination, points en route and  
10 guided route as keys to the search. This would further facilitate searching of facility information and expand the variety of available searching techniques. For this configuration, sought information may as well be given in the form of a search coverage which is expressed as  
15 an xxx km radius of a prescribed geographical points, such as the current location, or a guided route. In this case, of course, the search unit at the management center would search the set coverage of search.

Further, the search terminal functioning as a  
20 car navigation system may be enabled to set the destination or points en route based on facility information transmitted from the management center as a search finding.

The search terminal determines whether  
25 retrieved facility information has been utilized and, if it has been, transmits that facility information to the management center, which then stores the frequency of

utilization as described above. With this configuration, the search terminal can act as a navigation system allowing determination that, if a destination or points en route have been set based on a particular unit of facility information, that particular unit of facility information has been utilized.

Whereas the foregoing description referred to the invention as one of a facility information registration/ search system, the invention can as well be implemented as a management center, as one registration terminal, or as one search terminal.

Further areas of applicability of the present invention will become apparent from the detailed description provided hereinafter. It should be understood that the detailed description and specific examples, while indicating preferred embodiments of the invention, are intended for purposes of illustration only, since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description.

#### BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will become more fully understood from the detailed description and the accompanying drawings, wherein:

Fig. 1 is a block diagram illustrating a schematic configuration of a registration/search system according to the present invention;

Fig. 2 is a block diagram illustrating a schematic configuration of a car navigation system according to the present invention;

Fig. 3 is a flow chart of a registration request executed at the registration terminal according to the invention;

Fig. 4 is a registration flow chart executed at the management center according to the invention;

Fig. 5 is a flow chart of a search request executed at the car navigation system according to the invention;

Fig. 6 is a flow chart of search executed at the management center according to the invention;

Fig. 7A is an explanatory diagram showing an example each of registration template and search template according to the invention;

Fig. 7B is an explanatory diagram showing an example each of registration template and search template according to the invention;

Fig. 8A is an explanatory diagram showing an example of sequence of display screens on the car navigation system according to the invention;

Fig. 8B is an explanatory diagram showing an example of sequence of display screens on the car

navigation system according to the invention;

Fig. 8C is an explanatory diagram showing an example of sequence of display screens on the car navigation system according to the invention;

5 Fig. 9A is an explanatory diagram showing an example display sequence on the car navigation system according to the invention;

Fig. 9B is an explanatory diagram showing an example display sequence on the car navigation system  
10 according to the invention;

Fig. 10 is a flow chart of issuing an invoice at the management center according to the invention;

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

15 A preferred embodiment of the present invention will be described below with reference to drawings.

Fig. 1 is a block diagram illustrating a schematic configuration of a registration/search system  
20 1 embodying the present invention. The registration/search system 1 has a car navigation system 2 as a search terminal, a management center 4 as a management center, and a registration terminal 6 as a registration terminal. The management center 4 is  
25 provided with a data processor 40, a template storage 51 connected to the data processor 40, a facility information storage 52, a history storage 53 and a

communication unit 54.

The data processor 40 is what is commonly called a computer system, having a CPU, ROM, RAM, I/O unit and so forth, and takes charge of overall control of the management center 4. The template storage 51, the facility information storage 52 and the history storage 53 are the hard disks. In the template storage 51, registration and search templates are stored that differ from one facility type to another. In the facility information storage 52, facility information is stored that was supplied by information providers. In the history storage 53, the number of hits are stored and the frequency of utilization, to be described later, for each unit of facility information. The communication unit 54 is intended for data communication between the car navigation system 2 and the registration terminal 6. Data communication between the car navigation system 2 and the registration terminal 6 is preferably accomplished over a telephone line.

The registration terminal 6 is provided with a control unit 60, a communication device 71, a hard disk 72, a display device 73, a keyboard 74 and a mouse 75. The control unit 60 here has a CPU, ROM, RAM, I/O device and so forth, and the registration terminal 6 has a similar configuration to that of a personal computer. Therefore, the communication device 71 can be used as a modem. The display device is realized as a display

apparatus using a CRT or liquid crystals.

The car navigation system 2, as illustrated in Fig. 2, has a configuration centering on the control unit 10. To control unit 10 are connected a position  
5 detector 20, a map data input device 31, an operating switch group 32, a communication device 33, an external memory 34, a display device 35, a speech output device 36 and a remote control sensor 37. The control unit 10 is configured as an ordinary computer, provided with a  
10 CPU, ROM, RAM, I/O device and a bus line connecting these constituent elements.

The position detector 20 has a geomagnetic sensor 21, a gyroscope 22, a distance sensor 23 and a GPS receiver 24 for a GPS (Global Positioning System) to  
15 detect the position of the car based on electric waves from satellites, all of which are well known devices. This configuration having a plurality of sensors 21 through 24 complement one another as they are subject to errors differing in character. Depending on their  
20 levels of precision, some of the above-described sensors may suffice, or a rotation sensor for steering or a wheel sensor for each rolling wheel may be used instead.

The map data input device 31 is for entering map matching data, intended to enhance the accuracy of  
25 position detection, and map data. This data is entered from a DVD serving as a recording medium. Although a DVD is used in this embodiment, a CD-ROM, a memory card

or other appropriate medium may be used in place of the DVD.

The operating switch group 32 consists of touch switches or mechanical switches integrated with the display device 35, and are used for various input purposes. The communication device 33 functions when a so-called handy phone is connected to it, and data communication with the management center 4 takes place via this communication device 33.

The external memory 34 is a hard disk for storing necessary information for executing various processes. However, since the only function needed here is to store information, a different device, e.g. a semiconductor memory device may be used. The display device 35 is a color LCD or a CRT display device. Information is provided to a user from the car navigation system 2 via this display device 35. The speech output device 36, provided with a loudspeaker system (not shown), is for orally broadcasting from the system side route guidance or an input request. The remote control sensor 37 acquires operational information from the user via a remote control 37a. This configuration realizes the so-called navigator function. On the screen of the display device 35 is displayed, overlapping with each other, a car's current location mark entered from the position detector 20, map data entered from the map data input device 31, and

additional data displayed on the map including the guided route, name, distinguishing mark and so on. With car navigation system 2, when the location of the destination and, as required, designation of a specific route including an expressway (i.e. designation points en route) are entered from the remote control sensor 37 via the remote control terminal 37a and from the operating switch group 32, the optimal route from the current location to the destination is automatically selected to form and display a so-called guided route. As such, techniques for automatically setting the optimal route, the Dijkstra method and others are known. After this guided route is formed and displayed, route guidance is provided from the control unit 10 via the speech output device 36 according to the running condition of the car.

Furthermore, the car navigation system 2 in this embodiment can make a facility information search request with the management center 4, and reference, or utilize for the navigator function, facility information as the search result transmitted from the management center 4. Next, the operation of the registration/search system 1 embodying the invention will be described.

First, facility information registration that takes place between the registration terminal 6 and the management center 4 is described. Here, processing of a request for registration executed by the control unit 60



of the registration terminal 6 is described with reference to the flow chart of Fig. 3. This processing is executed when a data communication enable state is established between the registration terminal 6 and the management center 4 as a call is initiated by the registration terminal upon the management center 4.

At the first step (hereinafter abbreviated to S) 100, a facility information registration request is made with the management center 4. In response to this registration request, a facilities list indicating the facility types are transmitted from the management center 4. The facility types include, e.g. service stations, supermarkets, banks, hospitals, parking lots and amusement parks.

At S110 that follows, the display device 73 displays the facilities list indicating the facility types, and urges the communicating information provider to select a facility type. The information provider selects the facility type desired for registration via the keyboard 74 and the mouse 75. Then, at S120, the selected facilities is transmitted to the management center 4. Once the facility type is transmitted in this way, the management center 4, with its data processor 40, reads a registration template for registering a facility of the selected type out of the template storage 51 and transmits it. This registration template differs from one facility type to another, and contains

registration headings matching the facility type. To cite a specific example of the registration template, a registration template for registering information on a service station, for instance, has such registration headings as those listed in Fig. 7A. Here are eight registration headings comprising 1) station name, 2) location, 3) group name (indicating what oil company the station is affiliated with), 4) price of gasoline (regular), 5) price of gasoline (premium), 6) price of light oil, 7) other products sold and 8) incentive to customers. The heading "other products sold" is included because some service stations sell food items such as rice and/or sweets.

At S130, based on the registration template, the information provider is required enter information under each registration heading. Information to come under "2) location" is entered by having the provider point with the mouse 75 to the pertinent location on a map displayed on the display device 73. This associates the locational information with map data. The map data for displaying a map are transmitted from the management center 4. Information to come under "8) incentive to customers" may be, conceivably, free toilet paper rolls or free check-up of the car.

Then, at S140 that follows, it is determined whether indispensable items of information have been entered to ensure that sufficient but not excessive

information that can serve as search keys has been entered. For instance, in the registration template for service stations shown in Fig. 7A, conceivably the first through seventh items can be designated to be indispensable. If all the indispensable items are found entered (S140: YES), the items of facility information entered under the registration headings are transmitted to the management center 4 at S150, and the processing of this registration request is completed after that.

10 If any of the indispensable item is left out (S140: NO), processing from S130 is repeated.

Registration processing machine this registration request processing is executed by the data processor 40 or the management center 4. Now this registration processing will be described with reference to the flow chart of Fig. 4. This registration processing is repeatedly executed once a data communication enable state is established between the registration terminal 6 and the management center 4.

15

20 First at S200, it is determined whether a registration request has been received from the registration terminal 6. This processing matches the registration request at step 100 in Fig. 3, and the determination is affirmative if a registration request was made at S100. If it is determined here that a registration request has been received (S200: YES), the process will move ahead to S210. If there has been no

25

registration request (S200: NO), this registration processing is ended.

At S210, a facilities list indicating the facility types is transmitted. In response, the registration terminal 6 displays the facilities list as stated above (S110 in Fig. 3), and transmits the selected facility type (S120). Therefore, at the following S220, it is determined whether the selected facility type has been received. If the facility type has not been received here (S220: NO), this determination processing is repeated. If the facility type has been received (S220: YES), the process goes to S230.

At S230, according to the received facility type, a registration template is transmitted. This causes the registration terminal 6 to transmit facility information to be entered according to this registration template (S150 in Fig. 3). Therefore, at the next S240, it is determined whether facility information has been received. If facility information has not been received here (S240: NO), this determination processing is repeated. If facility information has been received (S240: YES), the process goes ahead to S250.

At S250, the facility information is stored into the facility information storage 52. At s260 that follows, the registration fee is calculated and stored. After that, this registration processing is completed.

Next, the search facility information operation that takes place between the car navigation system 2 and the management center 4 is described. The control unit 10 of the car navigation system 2, when the operating switch group 32 or the remote control terminal 37a via the remote control sensor 37 provides an input, calls the management center 4 and, awaiting the establishment of a data communication enable state with the management center 4, executes search request processing. This search request processing will is described with reference to the flow chart of Fig. 5.

First at S300, the user in the car is prompted to select a facility type and, upon selection by the user of a facility type to be searched. The selected facility type is transmitted to the management center 4. This type of facility is that registered with the management center 4, and is to be included in the facilities list transmitted at S210 in Fig. 4 by the management center 4 to the registration terminal 6. It can be, for instance, service stations, supermarkets, banks, hospitals, parking lots or amusement parks. As the facility type is transmitted, the management center 4 transmits a search template. This search template matches the registration template, in which search headings matching the registration headings are provided. As an example, a search temperate for searching information on a service station has such

registration headings as those listed in Fig. 7B. Here are a number of registration headings comprising 1) group name, 2) product planned for purchase, 3) desired price and 4) range of search.

5           At the next S310, the user is required to enter sought information based on the search template. Information need not be entered under all the search headings. Then at the following S320, the sought information is transmitted to the management center 4.  
10 In response, the management center 4 transmits facility information as the search result.

          Therefore, at the next S330, it is determined whether any search result has been received. If no search result has been received here (S330: NO), the  
15 determination processing is repeated. If any search result has been received (S330: YES), the facility information of the search result is displayed on the display device 35 at S340. In this embodiment,  
20 displayed facility information permits selection by operating the operating switch group 32 by the user, which can display detailed information on the located facility or display its location on the map. Route guidance can be initiated with the facility as the destination or a point en route.

25           At the next step S350, it is determined whether the identified facility has been set as either the destination or a point en route to determine whether

the facility information has been utilized. If it is determined here that the facility has been set as either the destination or a point en route (S350: YES), that facility information is provided to the management center 4 at step S360, after this search request processing is completed. If it is determined that the facility has not been set as either the destination or a point en route (S350: NO), processing at S360 is not executed, and this search request processing is completed.

To match this search request processing, the data processor 40 of the management center 4 conducts a search. This search processing is described with reference to Fig. 6. This search processing is repeatedly executed once a data communication enable state is established with the car navigation system 2. First, at S400, whether any facility type has been received is determined. This matches S300 in Fig. 5. If any facility type has been received (S400: YES), the process moves to S410. If no facility type has been received (S400: NO), the search processing is ended. At S410, a search template matching the received facility type is transmitted. In response, the car navigation system 2 transmits sought information entered based on this search template (S320 in Fig. 5). Therefore, at S420, whether the sought information has been received is determined. If the sought information has not been

received (S420: NO), this determination processing is repeated. If the sought information has been received (S420: YES), the process goes ahead to S430.

At S430, using the received sought  
5 information, the facility information stored in the  
facility information storage 52 are searched for any  
unit of facility information meeting the search  
conditions. If the entered sought information does not  
cover all the search headings as mentioned above, a  
10 search is executed based on the sought information that  
has been entered and transmitted.

At S440 that follows, the number of hits  
matching the unit of facility information that meets the  
search conditions (that has been hit) is incremented.  
15 The number of hits represents the number of times the  
unit of facility information has met the search  
conditions. This is stored into the history storage 53  
as stated above. Then, at the next S450, the unit of  
facility information as the search result is transmitted  
20 to the car navigation system 2. In response, the car  
navigation system 2, if the unit of facility information  
as the search result is utilized for setting the  
destination or a point en route (S 350 in Fig. 5: YES),  
notifies that utilized unit of facility information  
25 (S360). Therefore, at S460, it is determined whether  
the unit of facility information has been notified.  
Here, an affirmative determination is made of whether



the unit facility information is notified within a prescribed length of time, which may be three minutes for instance. If it is determined there that the unit of facility information has been notified (S460: YES),  
5 the frequency of utilization matching the notified unit of facility information is incremented (S470), and after that this search processing is completed. The frequency of utilization represents the number of times the unit of facility information has been utilized for setting a  
10 destination or a point en route, and is stored into the history storage 53 as described above. If the unit of facility information has not been notified (S460: NO), this search processing is ended without executing the processing of S470.

15 This process will now be more specifically described in operation with the car navigation system 2. Fig. 8A shows, together with a map, how the current position of the car is displayed on that map. In the lower part of the screen, a "facility" button indicated  
20 by sign A is displayed. When this "facility" is pressed, a screen requesting selection of a facility type emerges as shown in Fig. 8 (b). Incidentally, pressing the "facility" button means (where the operating switch group 32 consists of touch switches  
25 integrated with the display device 35) touching the pertinent part of the screen with a finger. Alternatively, the pointer on the screen may as well be

moved to make a deciding operation on the "facility"  
button image. A mechanical operating switch group 32  
can also be used, or a remote control terminal 37a via  
the remote control sensor 37 can be used. In the  
5 following description, any reference to a selecting  
operation or pressing a button indicates any of these or  
other known operations.

The screen shown in Fig. 8B displays a list of  
facility types. Any information that overflows the  
10 screen is displayed by using the scroll bar. The user  
places the facility type desired to be searched in a  
selected state (service stations are in a selected state  
in the illustration), and selects the facility type by  
pressing the decision button indicated by sign B. The  
15 selected facility type is transmitted to the management  
center 4 (S300 in Fig. 5).

Then, as the search template for service  
stations (see Fig. 7B) is transmitted from the  
management center 4 (S410 in Fig. 6), the user is  
20 required to enter search information based on this  
search template (S310 in Fig. 5) when the screen is as  
illustrated in Fig. 8C. The group name is among the  
search headings because there may be circumstance where  
a customer paying by credit card or by any specific  
25 means is entitled to a discount at a service station  
affiliated with such and such oil company. Entry of  
this group name is heading 1) in the search template.

Also the name of a product planned for purchase can be entered, and the desired price of that product can also be entered. These are 2). and 3), respectively, in the search template. The range of search can be designated, too, which is 4).

In this embodiment, the area around the current location is the default search range. However, when route guidance is under way in a navigator function, any set destination or point en route can be selected as well. It is also conceivable to set a radius of 3 km, for instance, as the default value of the surrounding area. It is also conceivable to designate the area as a radius of xx km.

A group name, a product planned for purchase or a range of search can be entered by selecting desired aspects out of a plurality of available options. For instance, the name of a product planned for purchase can be entered by selecting one out of the window of options indicated by sign C in Fig. 8C. Fig. 8C illustrates selection of gasoline (premium). For the price, it is conceivable to selectively enter preferred aspects out of numerals "0" through "9" that are displayed. It is also conceivable to choose one preset candidate, such as \90, \100, \110 and so forth. The greater the number of input items, the more desirable as the procedure of entering sought information is simplified.

Whereas pieces of information entered in this

manner constitute sought information, not all entered items of information need be actually entered in this embodiment as mentioned earlier. For instance, only the group name, product planned for purchase and its desired price, range of search, or any combination of these items can be entered.

When the "transmit" button indicated by sign D in Fig. 8C is pressed where search information has already been entered, the car navigation system 2 transmits the entered sought information to the management center 4 (S320 in Fig. 5). This causes the management center 4 to search its store of facility information according to the sought information (S430 in Fig. 6), and transmits the search result to the car navigation system 2 (S450).

The car navigation system 2 displays this facility information as a search result (S340 in Fig. 5) as illustrated in Fig. 9A. This example is a case in which the names of the retrieved service station, the price of the product planned for purchase at each service station, and the distance to each service station is provided. If one of these search results is placed in a selected state (the service station \*\* is in a selected state in the illustration) and the "details" button indicated by sign E is pressed, more detailed information can be referenced. These details match headings 6) and 7) in the registration template shown in

Fig. 7A. As the "location" button indicated by sign F is pressed, the location of the facility on the map is displayed. Since locational information as an item of facility information is stored in association with map data, the car navigation system 2 can readily display the location of the facility on a map. Further, if the "destination" button indicated by sign G or the "point en route" button indicated by sign H is pressed, the facility in a selected state is set as the destination or a point en route, respectively, of route guidance. If, for instance, it is set as the destination, a guided route to that destination is displayed on the map, and route guidance using the speech output device 36 is started as illustrated in Fig. 9B.

Incidentally, as described with reference to Fig. 4, the management center 4 stores facility information from the registration terminal 6 (S250), and then calculates and stores the registration fee (S260). Such registration fees are stored separately for each information provider, and the system manager monthly issues an invoice for the registration fees to each information provider. For this purpose, the data processor 40 executes an invoice issuance process as shown in Fig. 10 every month. Now, this invoice issuance processing will be described with reference to the flow chart of Fig. 10.

First at S500, stored registration fees are

read out. At the next step S510, the number of hits and frequency of utilization are read from the history storage 53, and the charge is discounted according to these number of hits and frequency of utilization. For  
5 instance, if the number of hits and the frequency of utilization are above respective prescribed levels, the total sum is discounted by 20%. Then, at the next step S520, invoice issuance processing is executed. This processing involves printing of invoices and accordingly  
10 supply of data to a printer unit (not shown). Then at S530 that follows, whether all the information providers have been billed is determined. If all the information providers have been billed (S530: YES), the invoice issuance process is completed. If any information  
15 provider has not yet been billed (S540: NO), the process from S500 is repeated.

Next, the effects of this registration/search system 1 embodying the present invention are described. The registration/search system 1 uses registration  
20 templates to reduce inconsistencies among facility information patterns registered by information providers. This enables sufficient but not excessive facility information including incidental information which would be convenient for later search. It further  
25 uses search templates to enable information matching registration headings to be entered as sought information.

The registration/search templates, available in different contents according to facility type, are stored in the template storage 51 of the management center 4, and transmitted from the management center 4 (S230 in Fig. 4, S410 in Fig. 6). In the registration/search templates, registration/search headings matching one type of facility or another are stated (see Fig. 7). This feature facilitates the registration/search operations and, moreover, makes possible search according to miscellaneous items of information which previously could not serve as search keys (incidental information). Furthermore, as the registration/search templates are transmitted from the management center 4, any increase in the variety of facility types can be readily addressed.

Entry of sought information based on the search template can be limited to information matching only some of the search headings. As a result, facilities can be searched according to only one item of information or the search can be narrowed by using a plurality of items, and incidental information can be used to enhance the search as well.

For users, abundant availability of types of information which do not meet the search conditions would make no sense and, even if available types of information meet the search conditions, the purpose of promoting the use of the facility covered by the

information can be fulfilled unless the available information is actually utilized.

In view of these points, in this registration/search system 1, the number of hits and the frequency of utilization for each stored unit of facility information stored in the facility information storage 52 of the management center 4 are stored into the history storage 53. Therefore, the number of hits and the frequency of utilization stored in the history storage 53 can be presented to information providers. This presentation of information is highly likely to help the information providers supply users with information they desire to have. As a result, information supplied by information providers can better meet the expectations of users.

Further, in the registration/search system 1, registration processing executed by the management center 4 is given a configuration involving calculation and storage of registration fees (S260 in Fig. 4) to bill information providers for their registrations (S520 in Fig. 10). By using the revenue of such registration fees to pay, for example, the costs of operating and maintaining the system or the costs to car navigation systems 2 of communicating with the management center 4, it will be an extra advantage to users, who might then be allowed to search facility information free of charge, and enable the system to attract many more



users.

This embodiment of the invention, discounts registration fees according to the number of hits and the frequency of utilization (S510 in Fig. 10). This  
5 motivates information providers to supply information desired by users, resulting in more facility information of high quality.

The registration terminal 6 of this registration/search system 1, using map data transmitted  
10 from the management center 4, enables facility locational information to be entered in association with the map data (S130 in Fig. 3). This enables the car navigation system 2 to use locational information on the identified facility to display the location of the  
15 facility on the map more easily.

Further, the registration/search system 1 can have a search request issued by the car navigation system 2, and expand the search range, instead of being limited to vicinities of the current location. It can  
20 include vicinities of the destination and points en route if they are set. Therefore, in this respect as well, entry of the search conditions is simplified. Since, conversely, it is also possible to set the destination and points en rout by utilizing retrieved  
25 facility information, it would be more convenient for users.

The control unit 10 of the car navigation

system 2 preferably corresponds to a "sought information input unit". The control unit 10 and the communication device 33 together correspond to a "sought information transmitter". The control unit 10 and the display device 35 together correspond to a "notifying unit". Processing at S310 in Fig. 5 corresponds to processing by the sought information input unit; that at S320, to processing by the sought information transmitter; and that at S340, to processing by the notifying unit.

Further, the data processor 40 of the management center 4 preferably corresponds to a "search unit". The data processor 40 and communication unit 54 together correspond to a "sought facility information transmitter". The facility information storage 52 corresponds to a "facility information storage unit", and the history storage 53 corresponds to a "search frequency storage unit" and a "utilization frequency storage unit" combined. Further, processing at S430 in Fig. 6 corresponds to processing by the search unit, and processing at S450, to processing by the sought facility information transmitter.

In addition, the control unit 60 of the registration terminal 6 corresponds to a "facility information input unit", and the control unit 60 and the communication device 71 together correspond to a "registrable facility information transmitter". Processing at S130 in Fig. 3 corresponds to processing

by the facility information input unit, and processing at S150, to processing by the registrable facility information transmitter.

The present invention is in no way limited by these features of the above-described embodiment therefore, but can be implemented in various other modes without deviating from the true spirit thereof.

(a) The registration terminal 6 of the registration/search system 1 associates facility locational information with map data. Therefore, where facility information is updated, this association with map data can be utilized to identify the facility information to be updated. In more specific terms, update processing is as follows. First, the registration terminal 6 makes an updating request in place of the registration request at S100 Fig. 3, and map data with which local information is associated, instead of a facilities list, is transmitted from the management center 4. The registration terminal 6 displays a map based on the map data instead of S120, and displays the facility locations overlapping the map. The information provider concerned is required to choose from the facility locations displayed on this map, and is enabled to identify on the map the facility the information to be updated.

Incidentally, though only facility locational information is associated with map data in the foregoing

embodiment, all facility information can be stored in association with map data.

(b) While the registration/search system 1 supplies facility information by using the car navigation system 2, a system can supply information using a mobile apparatus such as a handy phone or a laptop or handheld unit. Information may also be supplied from a desktop personal computer. If these apparatuses are used in combination, some users may use handy phones while others may use a car navigation system 2 to access the management center 4.

While the above-described embodiments refer to examples of usage of the present invention, it is understood that the present invention may be applied to other usage, modifications and variations of the same, and is not limited to the disclosure provided herein.